Oral Statement to CASAC Review Panel on the Draft Risk and Exposure Assessment for Sulfur Dioxide September 18, 2017

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Good morning, my name is Lindsey Jones, and I am a Senior Toxicologist with the Texas Commission on Environmental Quality (TCEQ). Thank you for the opportunity to speak to you about the Environmental Protection Agency's (EPA's) draft Risk and Exposure Assessment (REA) for Sulfur Dioxide (SO_2). Today, I briefly want to encourage the members of this committee to consider a few particular issues that we have noted in our preliminary review of the draft REA.

The first issue relates to the health endpoint used in the risk assessment model. The draft REA models benchmark increases in specific airway resistance (sRaw) for populations in three study areas. However, after numerous literature searches and conversations with a pulmonologist and other experts, it is clear that there is little scientific support for either identifying changes in sRaw as adverse or using sRaw as an independent health endpoint. Among the significant uncertainties that should preclude its use are poorly understood normal inter- and intra-individual variability, particularly variability between life stages (in this case, adults to children) and disease states, not to mention the apparent substantial variability introduced by different technicians and different clinics (Kaminsky, 2012; Mahut et al., 2009; Pekka Malmberg et al., 1999; Strohl et al., 2012). sRaw can provide information when used in conjunction with other pulmonary endpoints, but introduces too much uncertainty in isolation. If this endpoint is maintained in this analysis, the uncertainty really should be articulated and quantitatively considered.

The second issue relates to the failure to consider the possibility of a threshold in the draft REA risk model. The presence of a threshold is entirely plausible, as no controlled human exposure studies have tested exposure concentrations less than 200 ppb in free-breathing chambers and, as explained in my comments to CASAC on the REA Planning Document, the mode of action for biological reflexes in general and SO_2-induced bronchoconstriction in particular are reasonably explained with the threshold model (Kubin et al., 2006; NAS 2010). The REA Planning Document specifically highlighted the uncertainty in effects following exposures of less than 200 ppb and stated that sensitivity analyses using a threshold may be conducted in the REA (page 4-43, USEPA 2017). Unfortunately, however, the draft REA does not provide this additional analysis.

The next issue relates to the risk estimates. In Table 5-5 of the draft REA, the EPA details that only one of the three study areas was anticipated to have asthmatic individuals experiencing at least a 100% increase in sRaw. Table 5-6 goes on to detail the distribution of risk estimates in the Fall River area. Specifically, 48.1% of the risk in 2011, 96.5% of the risk in 2012, and 70% of the risk in 2013 was estimated to occur

following exposure to SO_2 concentrations below 100 ppb. These results are in direct contrast to the EPA's statement in the REA Planning Document that "there is uncertainty about whether SO_2 is causally related to lung function effects at exposure levels below 100 ppb" (page 2-22, USEPA 2017) If there is limited evidence to even support causality, how can the vast majority of risk be quantified at this level?

Finally, I would like to highlight the need for more clarity with respect to uncertainty in the draft REA. This especially evident in the lack of confidence intervals for risk estimates. All presentations of risk estimates in the REA and any subsequent documents should include confidence intervals because of the important context they provide for the estimates. It appears that the EPA has considered variability, given the substantial discussion in Chapter 6, so it makes sense that variability be captured with these values. In addition, the draft REA does not fully consider the substantial uncertainty in the current review. A lengthy table of qualitative uncertainty considerations is provided, yet the draft REA does little to quantitatively address these uncertainties in the actual risk assessment.

Each NAAQS has far-reaching implications, from both a public health perspective for the pollutant that they regulate and as a policy paradigm for other criteria pollutants that follow the same assessment process. Although we agree with the EPA's proposed conclusion that the existing SO_2 NAAQS should be retained without revision, we urge the members of this committee to give this REA a high level of scrutiny so that a strong, scientific precedent is set for this and other NAAQS.

Thank you, again, for the opportunity to provide these comments.

References

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